REMARKS

Applicants have thoroughly considered the Office action dated February 13, 2006 and have amended the application to more clearly set forth the invention. Claims 1, 3, 8, 14, 24, 50 and 60 have been amended and claims 2, 4-7 and 9-13 have been canceled by this Amendment B. Claims 1, 3, 8, 14-26, and 50-62 are thus presented in the application for further examination. Reconsideration of the application as amended and in view of the following remarks is respectfully requested.

Claim Rejections under 35 U.S.C. 112

Claims 1, 3, 8, 14-26, and 50-62 stand rejected under 35 U.S.C. 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 14 and 50 have been amended in consideration of the Examiner's comments to define the invention more specifically and consistently with the original disclosure. Notably, the various railroad levels have been defined in these claims, which are now submitted to define the invention with sufficient particularity and distinctiveness to be patentable to Applicant.

The Office asserts that the specification is insufficient in determining "optimizing," "optimizing parameter," "actual," "assumed operation parameters," "actual operating parameter," or "optimize." Applicants respectfully disagree. With respect to the term "optimizing" or "optimize" the specification clearly provides that the invention relates to optimizing railway operations, and more particularly to a system and method of optimizing railway operations using a multi-level, system-wide approach. In other words, optimizing refers to optimizing the operations of railway system across the levels of the railway system to improve performance. Moreover, applicants remind the Office that original claims constitute their own description. See *In re Gardner*, 475 F.2d 1389, 177 USPQ 396 (CCPA 1973). To this end, original claim 1, recited, in part, "***optimizing*** the operation within its associated level and to cooperate with a processor associated with

at least one other level ***to optimize*** an operation of railway system across the levels of the railway system." Original claim 14 recited, in part, "a first level configured to optimize an operation within the first level," "a second level configured to optimize an operation within the second level," and "said optimizing the operation within the first level and said optimizing the operation within the second level each being a function of optimizing a system optimization parameter." Accordingly, applicants submit that the terms optimizing are clearly defined.

With respect to the term "optimization parameter" original claim 15 recites, in part, that the system optimization parameter is indicative of fuel usage in the railway system, claim 16 recites, in part, that the system optimization parameter is an economic valuation of the time of delivery of cargo carried in the railway system. In other words, the optimization parameter refers to a particular characteristic that can be observed to determine if performance or operation of the railroad system has improved.

According to original claim 1, operational parameters define operational characteristics and data related to the level with which it is associated. Similarly, according to claims 14 and 50 "said first level including first level operational parameters defining changes in operational characteristics and data of the first level over a period of time." Accordingly, "assumed operational parameters" refers characteristics and data related to a particular level that is assumed as opposed to being sensed such as current location and speed, fuel level and fuel usage rate. For example, within the locomotive level, as disclosed in the present application, the time required to compute a movement plan in order to support the dynamic nature of railroad operations is a major constraint. For this reason, train performance data ***is assumed***, based on pre-computed and stored data based upon train consist, track conditions, and train schedule. To this end, claim 23 recites, in part, wherein at least one of the operational parameters is an assumed operational parameter, and claim 59 recites wherein operational parameters are assumed operational parameters.

The terms "actual operating parameters" in claims 24 and 60 have been replaced with the terms "actual operational parameters." Actual operational parameters refer to

sensed or measured performance data such as current location and speed, fuel level and fuel usage rate. For example, as disclosed in the present application, input data 1514 from the locomotive level may include locomotive health, measured horsepower, fuel level, fuel usage, measured tractive effort and stored electric energy. (See Application paragraph 116).

The Office further references MPEP 2173.05 (c) as a basis for rejecting claim 1. In particular, according to the Office, "claim 1 recites a broad recitation *said infrastructure level containing one or more railroad track network levels* and the claim also recites *said railroad track network level containing one or more train levels,* which is the narrower statement of the range/limitation." (See Office action at page 3). However, MPEP 2173.05 (c) provides that "use of a narrow numerical range that falls within a broader range in the same claim may render the claim indefinite when the boundaries of the claim are not discernible." However, the claim language cited by the Examiner has nothing to with range limitations, but rather describes the components of a multi-level rail system.

As known to those skilled in the art, a railway system has a multi-level or hierarchal structure. For example, the highest level of the structure includes the railroad infrastructure. As defined in Webster's Collegiate Dictionary (Eleventh Edition), infrastructure is:

> **1 :** the underlying foundation or basic framework (as of a system or organization)
> **2 :** the permanent installations required for military purposes
> **3 :** the system of public works of a country, state, or region; *also* **:** the resources (as personnel, buildings, or equipment) required for an activity.

As claimed and described in the present application, railroad infrastructure refers to the underlying foundation or basic framework (as of a railway system or railway organization). In this case, the underlying foundation of the railway system includes track networks, trains, consist, and locomotives. As indicated in Fig. 1 of the present

application, the levels of the multi-level railway operations system include from the top down, the railroad infrastructure level 100, the track network level 200, the train level 300, the consist level 400 and the locomotive level 500. In other words, from Fig. 1, it can be seen that the railroad infrastructure level 100 is the highest level, the track network level 200 is a sub-level of the railroad infrastructure level 100, the train level 300 is a sub-level of the track network level 200, the consist level 400 is a sub-level of the train level 300, and the locomotive level 500 is a sub-level of consist level 400. Thus, "infrastructure level containing one or more railroad track network levels and "railroad track network level containing one or more train levels, has nothing to with range limitations, but set forth the relationship between components of a multi-level rail system. Nevertheless applicants have amended claims to more clearly set forth the invention. In particular, applicants have deleted the terms "containing one or more railroad track network levels," "containing one or more train levels," "containing one or more consist levels," and "containing one or more locomotive levels" from claim 1. Amended claim 1 now recites, in part, a system for management of a multi-level railway system and its operational components that includes "a first processor associated with a railroad infrastructure level configured to control an operation of a railroad infrastructure operating within the railroad infrastructure level," "a second processor associated with a railroad track network level configured to control an operation of a railroad track network within the railroad track network level, ***wherein the railroad track level is a sub-level of said railroad infrastructure level,***" "a third processor associated with a train level configured to control an operation of a train operating within the train level, ***wherein the train level is a sub-level of said railroad track network level,***" "a fourth processor associated with a consist level configured to control an operation of a consist of a train within the consist level, ***wherein the consist level is a sub-level of said train level,***" and "a fifth processor associated with a locomotive level configured to control an operation of a locomotive within the locomotive level, ***wherein the locomotive level is a sub-level of said consist level.***" Applicants submit that amended claim 1 clearly defines the relationship between the components of a multi-level rail system as described and

illustrated in the application, and respectfully request that the rejection of claim based on MPEP 2173.05 (c) be removed. Claims 14 and 50 have been similarly amended, and are believed to be in compliance with MPEP 2173.05 (c) for substantially same reasons as claim 1. Accordingly applicants submit that claims 1, 3, 8, 14-26, 60-62 particularly point out and distinctly claim the subject matter applicant regards as the invention.

Claim Rejections under 35 U.S.C. 102

Claims 1, 3, 8, 14-26, 50-62 stand rejected as being anticipated by U.S. Patent No. 5,828,979 to Polivka et al. (Polivka). However, a claim is anticipated only if each and every element as set forth in the claim is disclosed, either expressly or inherently, in a single prior art reference. Verdegal Bros. v. Union Oil. Of California, 814 F.2d 628, 631 (Fed. Cir.1987). Applicants submit that each and every element as set forth in claims 1, 3, 8, 14-26, 50-62 is not found, either expressly or inherently, in Polivka. Thus, the cited reference does not anticipate the claimed invention.

Polivka discloses a system for controlling the "movement of plural trains through a network of track in a multiple route railway system, and more particularly to a method and system of controlling the movement of a lengthy freight train in which the train movements are precisely monitored and orchestrated in accordance with a dynamic schedule that is determined through an evaluation of, inter alia, delivery schedule requirements, coordination among all trains, applicable speed restrictions and the effects of the track topography and train consist on train response to brake and power applications." For example, as described in Polivka, "a train controller 208 aboard each train controls the train in accordance with a movement plan which is based upon a high-fidelity model of a railroad. The train's portion of the movement plan (e.g. its trip plan) may include a route (a list of track segments over which the train will pass) and the estimated time of arrival (ETA) and estimated time of departure (ETD) for each station along the route, and perhaps the velocity of the train at that point. In addition, a train's trip plan may contain an identification of the areas in which speed will be restricted due to the anticipated presence of other trains, or other factors. [The] train's trip plan may include data regarding each station of significance (e.g., a location and time at which a train must meet, pass, or merge with

another train, stop for car pickups or setouts, crew changes, or termination of the trip). As noted earlier, in addition to the movement plan and the initialization parameters, train controller 208 may receive and/or measure data indicating the prevailing wind and track conditions, the present position, the present time, the present velocity of the train, the traction motor current, the throttle position, along with the brake pipe pressure." In other words, Polivka discloses a control system for managing a planned trip of a multiple trains along a particular track according to a predetermined trip plan and/or sensed train data.

In contrast, the present application discloses a system for optimizing the operation of various operational levels of a multi-level rail system by exchanging data between each of the multi-levels. As described above, a railway system has a multi-level or hierarchal structure. For example, an infrastructure level 100 of the multi-level railway system refers to, for example, maintenance facilities and service sidings. Infrastructure data includes facility location, facility capabilities (both static characteristics such as the number of service bays, as well as dynamic characteristics, such as the availability of bays, service crews, and spare parts inventory), facility costs (such as hourly rates, downtime requirements), and the earlier noted data such as weather conditions, natural disaster and business objective functions. The next level below the infrastructure level is the track network level. The railroad track network level refers to, for example, the track layout (e.g., the path or route of one or more tracks), but also plans for movement of one or more trains over the track layout. (See application, paragraph 0042). The next level below the track level is the train level. The train level refers a train or trains operating within a track layout. As described in the present application, the infrastructure level processor 202 interacts with track level 200 and train level 300 to receive input data from these levels, as well as from within the railroad infrastructure level 100 itself, to generate commands to and/or provide data to the track network level 200 and the train level 300, and to optimize operation within the railroad infrastructure level 100.

To this end, claim 1 recites, in part, "a first processor associated with a railroad infrastructure level configured to control an operation of a railroad infrastructure operating within the railroad infrastructure level," "a second processor associated with a railroad track network level configured to control an operation of a railroad track network within the railroad track network level, wherein the railroad track level is a sub-level of said railroad infrastructure level, "each processor associated with each level being configured to provide to the processor

associated with at least one other level operational parameters that define operational characteristics and data related to the level with which it is associated," and "each processor optimizing the operation within its associated level and to cooperate with a processor associated with at least one other level to optimize an operation of the multi-level railway system across all the levels of the railway system." Polivka fails to teach or suggest a processor of one level of a multi-level railway system cooperating with a processor associated with a different level of a multi-level railway system to optimize an operation of the multi-level railway system across all the levels of the railway system as claimed and described in the present application. Accordingly, Polivka fails to anticipate amended claim 1.

Amended claim 14 recites, in part, a multi-level system for management of a railway system and its operational components that includes "a first level configured to optimize an operation within the first level," "a second level configured to optimize an operation within the second level, ... wherein the second level is a sub-level of said first level," and "said first level providing the second level with the first level operational parameters, and the second level providing the first level with the second level operational parameters." Amended claim 50 recites a system for management of a multi-level railway system and its operational components that includes "a first level including first level operational parameters defining changes in operational characteristics and data of the first level over a period of time," a second level including second level operational parameters configured to optimize an operation within the second level..., wherein the second level is a sub-level of said first level," and "said second level providing the first level with optimized second level operational parameters." Polivka fails to teach or suggest providing operational parameters associated with a one level to a different (i.e., second) level for purposes of optimization. Accordingly, Polivka fails to anticipate amended claims 14 and 50.

SUMMARY AND CONCLUDING REMARKS

In view of the foregoing, applicant submits that amended claims 1, 14, and 50 are allowable over the cited art. The remaining dependent claims are believed to be allowable for at least the same reasons as the independent claims from which they depend.

It is felt that a full and complete response has been made to the Office action, and applicant respectfully submits that pending claims 1, 3, 8, 14-26 and 50-62 are allowable over the cited art and that the subject application is now in condition for allowance.

The fact that applicant may not have specifically traversed any particular assertion by the Office should not be construed as indicating applicant's agreement therewith.

Any required fees or overpayments should be applied to Deposit Account No. 07-0846.

Respectfully submitted,

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